

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference SF-1075	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/JP2004/011019	International filing date (day/month/year) 27.07.2004	Priority date (day/month/year) 31.07.2003	
International Patent Classification (IPC) or national classification and IPC C07C263/20, C07C265/02			
Applicant SHOWA DENKO K.K. et al.			

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> <i>(sent to the applicant and to the International Bureau)</i> a total of sheets, as follows:</p> <ul style="list-style-type: none"> <input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. <p>b. <input type="checkbox"/> <i>(sent to the International Bureau only)</i> a total of (indicate type and number of electronic carrier(s)), containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>	
<p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Box No. I Basis of the opinion <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input checked="" type="checkbox"/> Box No. VII Certain defects in the international application <input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application 	

Date of submission of the demand 20.01.2005	Date of completion of this report 29.06.2005
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**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/JP2004/011019

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
 - international search (under Rules 12.3 and 23.1(b))
 - publication of the international application (under Rule 12.4)
 - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
 - a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

Description, Pages

1-29 as originally filed

Claims, Numbers

1-11 as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. The amendments have resulted in the cancellation of:
 - the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):
4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-11
	No: Claims	
Inventive step (IS)	Yes: Claims	3-7
	No: Claims	1,2,8-11
Industrial applicability (IA)	Yes: Claims	1-11
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

International application No.:
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1) Reference is made to the following documents:

D1: EP-A-0 936 214 (SHOWA DENKO KK) 18 August 1999 (1999-08-18)

2) The present application relates to a process for preparing a high purity (meth)acryloyloxyalkyl isocyanate comprising: subjecting a hydrolysable chlorine containing (meth)acryloyloxyalkyl isocyanate to a mixing treatment with an epoxy compound and an amine at a temperature of 110-160°C.

3) Re Item V

3.1 Novelty (Art. 33(2) PCT)

No document in the available prior art discloses a method of purification of (meth)acryloyloxyalkyl isocyanates, wherein an epoxy compound and an amine are added to the isocyanate at a temperature within the range 110-160°C. The subject-matter of claims 1-11 is therefore novel.

3.2 Inventive Step (Art. 33(3) PCT)

Before discussing inventive step, it is necessary to point out, that by the phrase "preparing a high purity (meth)acryloyloxyalkyl isocyanate from the resulting mixture" in Claim 1, the Applicant has defined the matter for which protection is sought, in terms of the result to be achieved. This merely amounts to the underlying problem, without providing the technical features necessary for achieving this result. Consequently, Claim 1 is so unclear (contrary to Article 6 PCT) that cannot be examined in terms of inventive step. For this reason, the following examination has been carried out under the assumption that the way how the high purity isocyanate is prepared has been indicated into Claim 1, namely by distillation of the resulting mixture.

Document **D1** is regarded as the closest prior art. **D1** discloses (cf. abstract) a method for producing an isocyanatoalkyl (meth)acrylate substantially free (100 ppm or less, cf. pg. 3, l. 30-31) of hydrolysable chloride. The method comprises mixing the isocyanate with an amine and/or an imidazole and an epoxy group-containing compound and then purifying it by distillation. The distillation is performed at a temperature of less than 100°C, under reduced pressure and in the presence of a polymerization inhibitor (cf. pg. 3, l. 36-37 and pg. 5, l. 44-45). In examples 1-3 of **D1** the process is illustrated by

purifying starting materials containing between 381 and 460 ppm of hydrolysable chloride. After reaction and distillation, the hydrolysable chloride content was in the order of the 30ppm. A further distillation of the product yielded the isocyanatoalkyl (meth)acrylate with a content of hydrolysable chloride below the detection threshold (<1 ppm).

The subject-matter of independent Claim 1 differs from D1 in that the process is carried out at a higher temperature, namely at a temperature between 110 and 160°C. According to the examples provided in the application, such a difference results in a better purification after single distillation. No document in the prior art suggests that a higher distillation temperature may result in an improved purification. However, it is clear that this has not been suggested since the skilled person knows that an increase in the temperature of distillation results also in an increased polymerization of the (meth)acrylate, leading to unacceptable yields. An inventive step may be acknowledged only for processes which provide better purification results, while keeping acceptable yields. In this connection, a process wherein a polymerization inhibitor is not present cannot be considered to solve the problem posed and is further not supported by the description (see particularly the examples, wherein phenothiazine is always present). Accordingly, an inventive step may be acknowledged only for claims 3-7.

3.3 Industrial applicability (Art. 33(4) PCT)

Is acknowledged for the whole set of claims.

4) Re Item VII

The first paragraph of the application relates to a document which is not available to the public, contrary to Article 5 PCT.

5) Re Item VIII

Independent Claim 1 is not clear (Article 6 PCT) for several reasons:

- As indicated in Point 3.2 here above, Claim 1 is defined in terms of the result to be achieved and the feature "polymerization inhibitor" is essential to the definition of the invention (cf. also Rule 6.3(b) PCT).

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- The relative feature "high purity" has no well-recognised meaning and leaves the reader in doubt as to the scope of the claim.
- The feature "amine" is not clear in view of dependent claims 9 and 10 and the examples, wherein the so-called "amine" is an imidazole. In the field of Organic Chemistry, imidazoles are not classified within the amines. It is therefore not clear what the Applicant means by the feature "amine".